EPSON®

Serial Interface for the GQ-3500

Printed in Japan
GO1 88.11-5

Y59099101000

Serial Interface

The serial interface is an option for your CQ-3500 printer. These pages tell you how to install and use the serial interface.

The GQ-3500 serial interface is actually two interfaces in one. It can be used as either an RS-232C interface (the factory setting) or an RS-422 interface, depending on the settings of the jumpers on the circuit board.

Setting up the Serial Interface

When you receive your serial interface, it is configured as an RS232C interface, 9600 baud, 8 data bits, no parity, 1 or 2 stop bits, with the printer ready protocol enabled. This configuration will work for many applications

To use this configuration with® PC computers, use the following command at the DOS prompt

```
MODE COM1:9600,N,8,1,P
```

If you need to change the configuration of the serial interface follow these steps:

1. Refer to your computer and software documentation to see what the requirements are for a serial interface printer.

2. Select the RS-232C or RS-422 interface. The jumpers at Jl and J2 will have to be reconfigured for RS-422. Because RS232C is the factory setting, the jumpers will not have to be reconfigured if you choose this interface. For information on the location of Jl and J2 and on how to reconfigure the jumpers for the specific settings described below, see the Serial Interface Jumpers section.

   If you have changed the factory settings and want to reconfigure the lumpers for RS232C operation, set the jumpers at Jl and J2 as follows. At Jl, move REV, RD, and SRI to the left. At J2, all jumpers should be disconnected.

For RS422 operation, set the jumpers at Jl and J2 as follows. At Jl, move REV, RD, and SRI to the right. At J2, set all jumpers in the installed position, except for TR+ and TR-.

Jumpers that were not given a especific setting above do not need to be changed to select RS-232C or RS-422 operation (although they may affect how the interface works).

3. Select a baud rate by setting DIP switches 4-1, 4-2, and 4-3 as indicated in Table 2. (For more information on setting DIP switches, see the Serial Interface DIP Switches section of this chapter.)

4. Select 7 or 8 data bits by setting DIP switch 4-4 on for 8 bits per character or off for 7 bits per character. Using 8 bits per character is usually best. If you selected 7 data bits, select even, odd, or no parity and set DIP switches 4-5 and 4-6 appropriately.

5. Select a handshaking protocol. If you are using a commercial software program, look in the manual to see if it requires a particular protocol. If not, try the printer ready protocol. Set DIP switches 5-l through 5-4 appropriately. Note that you can use more than one protocol at the same time. For additional information, see the Communications Protocols section.

6. Customize the interface if you need more control of the serial interface. Study the functions shown in Table 3 that describe the jumpers. For example,' it's possible to add DSR, CIS, and DCD control to the interface.

Installing the Interface

Installing the serial interface is easy and doesn't require any tools. Just follow these steps:

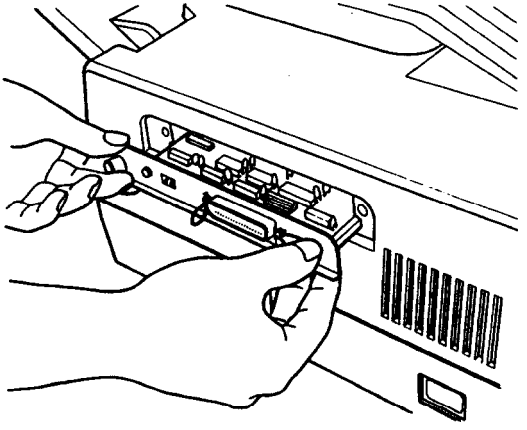
1. Make sum that the power to the printer is off.

2 Set the DIP switches on the interface card as described in Appendix C. Use a ballpoint pen or similar object to set the Switches

3. Configure the jumpers on the serial interface card as described above.

4. Remove the parallel interface from the back of the printer by loosening the two Knobs and pulling its straight out as shown in **Figure 1. Store the parallel in the box that the serial interface came in**

Figure 1. Removing the interface



5. Slide the serial interface into the slot on the back of the printer until it is flush with the printer case.

6. Tighten two two knobs to secure the interface.

7. Connect the serial cable from your computer to the interface.

The Serial Interface DIP Switches

On the right side of the serial interface are two banks of DIP switches, as shown in Figure 2. Group 4 is on the left and 5 is on the right.) switches control many of the of the interface ,as detailed in Table 1. You can use a ballpoint pen to change the switch settings. Because DIP switch groups 1 and 2 are the same for both the serial and parallel, the DIP switch information in Chapter2 and Appendix C applies to both interfaces

Figure2. The serial interface DIP switches

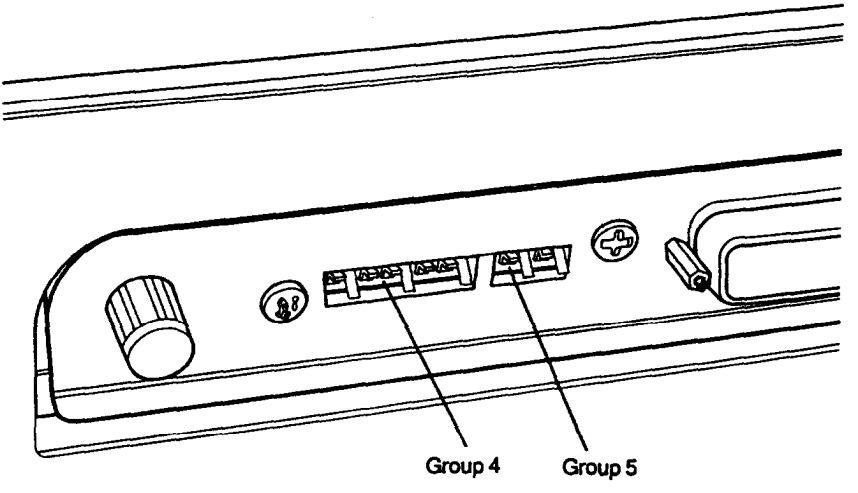


Table 1. Serial interface DIP switches

Switch	Function	ON	OFF	Explanation
4-1 4-2 4-3	Baud rate	See Table 2		Sets the data transfer (baud) rate for the serial interface.
4-4	Bits/character	8	7	Sets the number of data bits in each character of information sent to the printer.
4-5	Parity	ON	OFF	Turns parity checking on or off.
4-6	Parity	Even	Odd	Selects even or odd parity checking.
4-7	Stop bits	2	1	Sets the number of stop bits on each character of information sent to the printer.
4-8	Not used			
5-1	XON/XOFF	ON	OFF	Turns the XON/XOFF protocol on or off.
5-2	ETX/ACK	ON	OFF	Turns the ETX/ACK protocol on or off.
5-3	DTR ctrl	ON	OFF	Turns the printer ready protocol on or off.
5-4	Mult XOFF	ON	OFF	Turns multiple XOFF control on or off.

Setting the data trader rate

The following table shows the DIP switch settings for the various possible data transfer (baud) rates

Table2. Baud rate settings

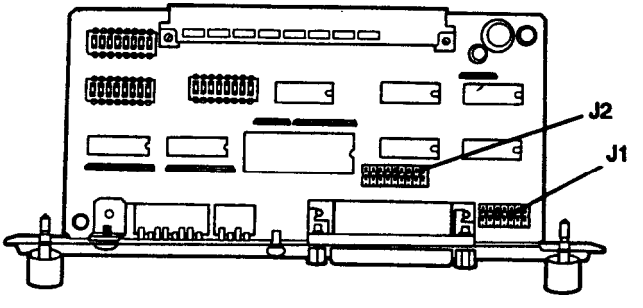
Data transfer rate	4-1	4-2	4-3
300 baud	OFF	OFF	OFF
600 baud	ON	OFF	OFF
1200 baud	OFF	ON	OFF
2400 baud	ON	ON	OFF
4800 baud	OFF	OFF	ON
9600 baud	ON	OFF	ON
19200 baud	OFF	ON	ON

The Serial Interface Jumpers

The following tables describe the functions of the jumpers on the serialinterface. The main function of these jumpers is to switch between RS-232 C and RS-422 operation, but some of the jumpers allow you to customize the interface.

The jumpers are located on the interface card as shown in Figure 3.

Figure3. The serial interface jumpers



The jumpers at Jl

The jumpers at J1 are two position jumpers. The small plugs can be moved from the left two wires to the right two wires to change the settings. Table 3 describes the functions of the jumpers at Jl. When delivered from the factory, all jumpers are in the left position.

Table3. Functions of the jumpers at J1

	Left	Right	
DTR	P	N	In the P (positive) position the printer will receive data when DTR, REV, or TR+ is high. In the N (negative) position the printer will receive data when DTR, REV, or TR+ is low.
REV	S	D	In the S (single) position pin 11 carries the REV signal for RS-232C operation. In the D (differential) position pin 11 carries the SD- signal for RS-422 operation.
RD	S	D	In the S (single) position the RXD signal is active for RS-232C operation. In the D (differential) position the RD+/RD- signal is active for RS-422 operation.
SR1	S	D	In the S (single) position the DSR signal is active for RS-232C operation. In the D (differential) position the DM+/DM- signal is active for RS-422 operation.
SR2	I	E	In the I (internal) position the DSR and DM+/DM- signals are fixed to the ready state. In the E (external) position the host computer must furnish the DSR or DM+/DM- signal.
CTS	I	E	In the I (internal) position the CTS signal is fixed high. In the E (external) position the host computer must furnish the CTS signal.
DCD	I	E	In the I (internal) position the DCD signal is fixed high. In the E (external) position the host computer must furnish the DCD signal.

The jumpers at J2

Jumpers at J2 are single position jumpers; they can be either installed or disconnected. To change the settigs of these jumpers you must put a jumper plug across the two pins. To disconnect a jumper plug, simply move the plug so that it rests on the left pin only, leaving the right pin open. (All plugs are in this position when the interface is delivered from the factory.)

Table. Function so the jumpers

T2	Connects DM+ and DM- through a 120 ohm resistor.
TI	Connects RD+ and RD- through a 120 ohm resistor.
	Connects RD- to pin 9
E L	Connects RD+topin 10
D M	Connects DM- to pin 23
DM+	Connects DM+ to pin 24
SD+	Connects SD+topin 12
TR+	Connects TR+ to pin 25
TR-	Connects TR-to pin 13

Communications Protocols

To achieve the maximum printing speed, the computer should send characters to the printer faster than the printer can print them. This ensures that the printer has to stop and wait for more information. But if you continuously send information to the printer faster than it can print, sooner or later the printer's buffer will overflow and information will be lost. A communications protocol keeps the computer from sending more information than the printer can handle. *

The GQ-35CN7's serial interface can use three different kinds of communications protocols These are described in detail below.

The ETX/ACK protocol

The ETX/ACK protocol uses a special pair of control codes, ETX (ASCII 3) and ACK (ASCII 6). The system is very simple: whenever the GQ-3500 gets an ETX out of its input buffer it sends an ACK back to the computer. When the computer receives the ACK it knows it is safe to send more information to the printer without fear of overflowing the buffer.

The GQ-3500 has a buffer that will hold up to 102 characters, including the ETX code at the end of the group. The computer can send the first group of characters and then stop until the first ACK is received. From then on,every time an ACK is received, another group of characters can be sent.

DlP switch 5-2 controls ETX/ACK protocol. If DIP switch 5-2 **iS Off, the GQ-3500 is ignored the ETX code.**

The DCl/DC3 or XON/XOFF protocol

The DC1/DC3 protocol also uses a special pair of control codes, DCl (AscII 17 decimal, also knwon as XON) and DC3 (ASCII 19) decimal, also known as XOFF) This communications protocol is selected by turning DIP switch 5-1 on.

In this protocol the printer sends a DC3 to the computer to suspend data entry under the following conditions

1. when the input buffer becomes nearly full (within 128 bytes)

2 When the printer goes offline (by pressing the ONLINE button)

3. When the printer runs out of paper

4. When the printer runs out of toner

5. When an errror is detected.

when the computer receives the DC3 signal it must stop within 128 characters) sending information until the printer sends a DCl signal to say that there is more room in the buffer. The printer sends the DCl signal when the buffer has room for 255 characters

If DIP switch 5-4 is on, the printer will send an additional DC3 after each additional character it receives after it sends the first DC3. This is called the multiple XOFF function.

The printer ready protocol

The printer ready protocol is a hardware protocol because it uses one of the wires in cable connecting the computer and printer to tell the computer where , the printer is ready to accept information. This communications potocol is selected by turning DIP switch 5-3 on.

The DTR signal (pin 25 of the GQ-3500's interface connector) tells the computer that the printer is ready to accept data when it is high. The signal goes low when one of the following conditions occurs:

1. When the input buffer becomes nearly full (within 128 bytes)

2 When the pinter goes off line (by pressing the ON LINE button)

3. When the printer runs out of paper

4. When the printer runs out of toner

5. When an error is detected.

when the DTR signal goes low, the computer musts stop sending data within 128 characters The signal goes back high when the buffer has room for 255 Characters.

If an error conditionoccurs (conditions 2-5 above), the DTR signal will only return to high error has been cleared and the ON LINE button-

When DIP switch 53 is off the DIR pin is always high.

When you are using the Rs422 interface, the function of the DTR pin is taken on by TR+ (pin 25) and TR- (pin 13).

RS-23X Pin Assignments

The RS-232C connector pin assignment and a description of the respective interface signals are shown in Table 5.

Table5. *Pins and signals*

Pin	Signal	Direction	Description
1	CHASSIS GND	--	This line is connected to the printer chassis.
2	TXD	OUT	Transmitted data. This pin transmits serial data from the printer to the computer.
3	RXD	IN	Received data. This pin transmits serial data from the computer to the printer.
4	RTS	OUT	Request to send. This pin is held high by the printer.
5	CTS	IN	Clear to send. This pin indicates that the computer is ready to receive data from the printer. The printer will not proceed unless this signal is high. This signal is normally fixed high by jumper J1-CTS.
6	DSR	IN	Data set ready. This pin indicates that the computer is ready to communicate. It must be high for the printer to receive data. This signal is normally fixed high by jumper J1-SR2.
7	SIGNAL GND	--	Signal ground. This pin provides a ground for all the signal lines.
8	DCD	IN	Data carrier detect. This signal indicates that the carrier is being received by a modem. The printer will not accept data unless this pin is high. This signal is normally fixed high by jumper J1-DCD.
11	REV	OUT	Reverse channel. This pin is connected to pin 20, the DTR signal.

Table 5. Continued

Pin	Signal	Direction	Description
20	DTR	OUT	Data terminal ready. This pin indicates that the printer is ready to receive data. If printer ready protocol is not selected, this pin is always high (i.e. the printer is ready to receive data). If printer ready protocol is selected, this pin indicates that the printer is ready to accept data when it is high, and indicates that the printer is not ready to accept data when it is low. When the DTR signal goes low the host computer must stop sending data within 128 characters. The phase of this signal can be changed (so that the low level indicates ready-to-receive) by moving jumper J1-DTR from P to N.